

Unusually Deep Snowpack Spells Flooding Concerns for Southwest Lower Michigan

Snow depth reports across the area have been in the 15 to 25 inch range. Approximately 2 to 5 inches of water is contained within the snowpack. As of February 5, 2014, the official snow-water equivalent measurement at NWS Grand Rapids was 5.0 inches with a snow depth of 22 inches.



Figure 1: The tool NWS Grand Rapids uses to obtain the snow-water equivalent of a snowpack.

Figure 1 (left) shows the instrument that is used to measure snow-water equivalent of snowpack. This instrument measures the weight of the snowpack that is converted to the snow-water equivalent.

Figure 2 (below) is a map showing the snow-water equivalent over Southern Lower Michigan as estimated by the National Weather Service hydrologic forecast models. For the Muskegon River basin, the models indicate 1.5 to 3.0 inches of water in the snowpack (light green to red). For the Grand River basin, the models indicate 2.0 to 4.5 inches of water in the snowpack (yellow to purple). For the Kalamazoo River basin, the models show 2.5 to 3.5 inches of water in the snowpack (orange to dark red).

In addition to how much water is in the snowpack, another important factor for flooding potential is the frost depth in vegetated areas, or the depth of frozen ground. Frozen ground causes more runoff from rain and snow melt, because it acts like pavement and prevents water from soaking into the ground. Frost depth readings across Lower Michigan range from 2-6 inches, which is near normal for this time of year.

The snowpack, how much water is in the snowpack, ice coverage and ice thickness on rivers across Lower Michigan are all above normal for this time of year. These factors all increase the risk for flooding from snow melt and ice jams.

2013 precipitation totals were 7.18 inches above normal for Grand Rapids, 9.70 inches above normal for Lansing, and 10.24 inches above normal for Muskegon. This wet pattern continued into January 2014, with Grand Rapids, Lansing, and Muskegon receiving 2.09 inches, 1.65 inches, and 2.03 inches above normal for the month respectively. Above normal winter precipitation means that heading into Spring soils are relatively moist and favorable for flooding to develop.

All of these factors come together to enhance the potential for flooding across Southwest Lower Michigan. The forecast calls for continued cold weather through at least February 12, 2014. This means no significant snowmelt is anticipated, and frozen rivers should stay locked in place with no ice jam flooding issues at this time. If the current trend continues into Spring, the risk for significant flooding will increase due to a higher likelihood of a significant warm up, rapid snow melt, ice jams and rain occurring simultaneously.

Figure 2: Southern Lower Michigan snow-water equivalent estimates from hydrologic models - as of February 3, 2014

